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Public Health Integration in EIA

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Health in Environmental Assessments

The practice of environmental assessments originated with the US National Environmental Policy Act of 1969 (NEPA). It states as one of its purposes the promotion of efforts “which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man” (NEPA 1969, Sec 2). However, in the practice of environmental assessments, human health considerations were either ignored or given only superficial attention during the 1970s (Go 1988). Although human health considerations have become a specific part of most legislative frameworks on environmental assessments all over the world (Sutcliffe 1995), and though the normative literature on impact assessment considers social and health aspects an integral part of EA, they are frequently left out in real life projects (Ortolano and Shepherd 1995).

In 1986, the World Health Organization held a meeting on the health and safety component of environmental impact assessment. The report of this meeting was one of the first to address specifically the issue of human health in EA. The expert group proposed to use the risk assessment and management process in order to study the future health effects of projects:

Chemical risk management is designed to be applied to chemicals without reference to a specific project context, often directed to the setting of regulatory or advisory exposure limits or other controls. The health and safety component of EA is concerned with, among other things, the health effects of chemicals within project or policy appraisal as part of the permitting procedure for that development. Chemical risk management (WHO model) and the assessment of environmental health effects are closely related, but they are different procedures for different

purposes. (WHO 1987, p 2).

The choice of the risk assessment and management process at that time was not aimed to limit the scope of health impacts to its toxicological aspects. The authors made a pragmatic choice based on the availability of risk assessment as a specific methodology for health. They made the explicit statement that social determinants of health should be included in environmental assessments :

The health component of EA should include not only disease-related effects but also all impacts which might change the well-being of neighbouring populations whether it be for better or worse. These might include psychological effects of proximity of certain types of development and improvement in health as a result of increased employment and wealth in a community. (WHO 1987, p 9)

These statements from 1987 still do apply for today's methodology of health assessments as a specific part of environmental assessments. As Ortolano and Shepherd (1995) have pointed out health assessment is frequently absent even for projects with significant human health impacts. Considerable efforts have been undertaken on an international scale to propose and promote the risk assessment based health assessment process (Turnbull 1992). Go (1988) pointed out some methodological difficulties in applying the risk assessment process to health determinants outside the toxicological aspects :

Secondary health and socio-economic effects are ubiquitous in all projects of significance that affect population growth and movements.

These types of impact are generally subject to exogenous events that are probabilistic or undeterminable.

[..]because of the stochastic nature of physical and biological processes and the fact that the most important health consequences are frequently dependent on undeterminable or probabilistic factors and exogenous events", the quantification of human health is extremely complex.

According to Go the complexity of the relationships between health risks from toxicological and microbiological sources and health protective factors of economic and social development makes it impossible to construct coherent quantitative models in order to predict the overall impact of a project on the health of a given population. None of the recent publications dealing with public health in environmental assessment (Harvey 1990; Turnbull 1992; Arquiaga, Canter et al. 1994; Sutcliffe 1995) integrate social determinants of health, Comité de santé environnementale du Québec (1993) being the only exception.

A brief historic analysis may help to understand the current limitations regarding public health interventions in the environmental assessment process. Environmental health impact assessments have evolved inside the health protection tradition in the field of environmental health. Environmental health is concerned with controlling health risks associated with the physical environment (HEADLAMP 1995). In the last decade, health promotion has emerged as the new public health strategy expanding the individual lifestyle approach of health education to include collective elements like the physical and social environment and public policies. The framework of health promotion has become so prominent and dynamic that the term New Public Health has been coined to describe this renewal process in public health thinking, intervening and researching (Ashton and Seymour 1988; Dean 1994). In Canada this conceptual renewal process has resulted in the adoption of a health determinant framework for reorienting the health system (Federal, provincial and territorial advisory committee on population health 1994).

Social determinants of health have emerged as the most powerful modifier for population health. The influence of poverty on the health status of a population has been acknowledged for a long time. There is a strong historic correlation between economic growth and mortality rates. Economic growth is inversely related to overall mortality rates with a time lag of up to 14 years. Economic recession, as measured by the unemployment rate and by bankruptcy rate, is positively related to mortality over a 10 year period, with an

initial peak of mortality 2 to 3 years after the recession's peak (Brenner 1995). Franks, Adamson et al. (1991) have established a dose-response relationship of 5.4 per 100,00 increase in male stroke death for every 1% rise in male unemployment. Health impacts of unemployment can be shown not only for the unemployed person himself, but for the whole family unit (Canadian Public Health Association 1996). Brenner (1983) showed correlations between infant, fetal and maternal mortality rates and adverse economic trends.

Studies on the contribution of unemployment and poverty to health status select populations pushed to the margins of society to demonstrate the direct and determinant influence of social determinants of health. Social determinants of health are ubiquitous in society. A prospective study which followed 10 000 British civil servants for nearly 20 years established an age-standardized mortality 3.5 times higher in the clerical and handbook grades than in the higher administrative grades (Marmot and Theorell 1988). For all levels of society social integration and mortality are strongly correlated. A relative risk ratio of mortality between 2 and 4 (lowest level of social integration versus the highest level) has been established in different studies (House 1988).

There has been much debate about the exact meaning of strong, positive associations in epidemiological studies between social variables and health outcomes. Unemployment has been one the variables which has received considerable attention from social epidemiologists. A review of available evidence concludes that unemployment fulfills most of Hill's criteria of causal relationship. Although the exact mechanisms are still hypothetical, the available evidence has lead many authors to suggest mechanism of causation (Canadian Public Health Association 1996).

The effects of the external social system are mediated through endocrine and immune pathways. A prolonged physiological stress has been shown to have numerous deleterious

biological effects. Members of the higher social and economic class present short term elevation of adrenaline and blood pressure, while members of the lower classes experience a chronic form of stress, leading to higher blood pressure, circulating fibrinogen blood levels and impairment of the immune system.

Looking at heart disease among male workers, [different studies] show that people in jobs that impose unpredictable and uncontrollable demands, yet that leave very little room for individual discretion in responding, and that in addition underutilize the individual's skills and abilities - no opportunity for personal growth tend to have higher rates of heart disease, and death.

(Evans, Barer et al. 1994, p 22)

The emerging picture of the complex interrelations between social organization, self-esteem and biological systems does not yet permit to build models predicting the effects on population health of modifying certain social parameters. Focusing only on poverty as the principal determinant of population health status is incoherent with today's knowledge of the pervasive influence of social factors in the health of all subgroups in the population and of the complexity of causal relations. For example, advocating the creation of wealth through economic growth and job creation may not be an efficient strategy, in spite of social determinants being the most powerful modifier for population health.

[W]ithin the strong cross-national correlation between health and wealth, certain societies achieve aggregate health status measures that are much higher than their income levels would « predict », while others are much lower. [...] the health of a population depends upon the equality of income distribution, rather than the average income, so that rising average incomes can be associated with declining health, if the resulting wealth becomes concentrated in fewer pockets.

(Evans, Barer et al. 1994, p 23)

In the case of unemployment the fall of social support through unemployment may be central in the causal pathway between unemployment and health. Rebuilding a social network during a period of long term unemployment may contribute to minimize and balance the effects of unemployment on health status (Bartley 1994). Based on accumulating knowledge about the causal mechanisms on social determinants and health, public health has focused increasingly on questions of equity and social support as intermediate variables amenable to public health intervention.

If it is currently impossible to conceive predictive models linking social change to population health status on a large scale, it is even more the case for predicting a change in the health status of a local community undergoing social change secondary to the planning and implementation of a project. However the absence of coherent quantitative models in order to predict the overall impact of a project on the health of a given population does not

mean that public health should not address the social determinants of health in environmental assessments. Public health professionals are able to estimate tendencies and types of effects of many social determinants on the health of a community.

Public health has been defined as “**one of the efforts organized by society to protect, promote, and restore the people's health. It is the combination of sciences, skills, and beliefs that is directed to the maintenance and improvement of the health of all the people through collective and social actions. Public health activities change with changing technology and social values, but the goals remain the same: to reduce the amount of disease, premature death, and disease produced discomfort and disability in a population. Public health is thus a social institution, a discipline, and a practice.**”

(Last 1988, p 107)

Public health needs sufficient evidence in order to take action on health problems and determinants, it does not need absolute evidence. McKeown (1979, pages 128-130) provides the following thoughts on the degree of evidence, necessary for public health action :

- *Other examples could be cited in support of the view that action is often needed to protect and promote health in circumstances where the evidence is less than*

complete. Moreover, in many cases it is questionable whether within the foreseeable future the evidence will be complete. To assess precisely the respective roles of diet, exercise and smoking in the causation of coronary artery disease, a massive human experiment would be needed, with division of a population into multiple experimental and control groups. Such an investigation would present formidable ethical, technical and administrative difficulties. Does this mean that no action can be taken in this and similar cases because the grounds, however suggestive, are not conclusive?

- *In the light of such difficulties I believe it will often be desirable to act on the basis of high, or even moderate probabilities, on what has been called 'a burden of prudence' rather than 'a burden of proof'. [...] it should be recognized that conclusive evidence of harm or benefit to health is often an unrealistic requirement.*

Current knowledge of the social determinants of health makes it imperative to integrate these aspects into the public health process of environmental assessments. Influencing known social determinants of health affected by projects is a valid and important public health action. The conceptual renewal process of health promotion and the New Public Health provides ample arguments and support to address the social determinants of health in environmental assessments (Banken 1998). Social assessment practitioners have developed a framework for identifying, predicting and managing social change secondary to the planning and implementation of a project. A public health approach to the social determinants of health should be integrated into the social impact assessment process.

Prediction, Social Learning and Sustainable Development

Prediction

Predicting the consequences of a project is one of the basic characteristics of environmental assessments. By providing predictions of consequences to the decision makers, the project can be modified in order to minimize the negative and maximize the positive consequences.

In the area of social impact assessments, this process of assessing the future social consequences of planned actions must be distinguished from the enterprise of making predictions of precise social events. It is possible to predict certain types of impacts and some likely patterns of response. This does not mean that the social assessor is capable of making exact quantitative predictions according to a cause/effect pattern.

Each action in an interaction sequence has, at best, only a modest predictability unless many parameters such as the relative power of participating groups remain essentially unchanged. As a result the probability of predicting a number of sequential interactive actions rapidly approaches zero.

(Finsterbusch 1995, pp. 16-17)

The use of the term predictive social impact assessment in the social impact assessment literature usually signifies the prediction of tendencies and types of impacts. It does not mean the prediction of a precise social event at a specific point of time.

In order to better understand social impact assessment it is useful to compare social and

biophysical effects of projects. Social consequences resemble biophysical consequences (Interorganizational Committee on Guidelines and Principles for Social Impact Assessment 1994, p 14) :

They can be valued as negative as well as positive

They can be of short or of long duration

They are dependent on the project setting

They are likely to be cumulative

However, social science generalizations can never achieve the law-like status of those in the physical sciences. Social systems are subject to the influence of conscious human beings who have the capacity to influence the system through individual choices. The future of social systems is open while the future of natural systems is causally determined.

The main difference between social and biophysical effects of projects is stated in the sociological saying : *What is perceived to be true, even if false, has real consequences* (Renaud 1994, p 317). Social impacts start with the very beginning of the project. Already during the planning stage perceptions of the project are evolving, personal or business decisions are made, tension between project proponents and opponents can diminish the social cohesion in the community. Biophysical impacts only start with the implementation of the project.

The accuracy of predictions in environmental assessments depend on many interrelated factors, like the quality of guidelines for producing the environmental impact statement, the appropriate timing in initiating the assessment, the availability of scientific knowledge and the use of scientific knowledge by consultants.

The first decades of environmental assessments have been marked by procedural and

methodological problems. The lack of predictive accuracy has been typical of biophysical as well as social predictions. Among the 10475 environmental assessments conducted in the United States between 1970 and 1980, Culhane, Friesma et al. (1987) choose a sample of 151 environmental impact statements. They found that the predictions were either too vague to be verifiable or that they had only a rather weak predictive accuracy.

Boothroyd (1995) conducted a study to identify and evaluate the predictive accuracy of social impact assessments of Canadian megaprojects. The accuracy of the predictions was rather poor, positive impacts tended to be less than anticipated, as were negative impacts except for the impacts of hydroelectric megaprojects on native communities.

Gagnon (1994a) conducted an in depth post evaluation (evaluation research documenting the post implementation impacts) of the social consequences of an aluminum smelter. Her findings confirm the relatively poor accuracy of the initial predictions. Contrary to Boothroyd's metastudy, Gagnon found the real impacts to be more important than the original projections . Gagnon attributes this weakness in predictive social impact assessment to the concepts and methodological orientations. The initial social impact assessment used a causal model, predicting the social impacts on the basis of a quantitative social analysis and the project description. The quantitative social analysis favours organizational aspects of the community (infrastructure, constructions, land planning) and neglects the meanings, perceptions and social significance of these changes.

The scientific content and the accuracy of predictions are an important element in the environmental assessment process and they can be improved further. The limiting factors of the success and effectiveness of environmental assessments depend much more on procedural aspects like establishing standards for quality performance, upgrading processes like public involvement, considering cumulative effects and strengthening the

practice of assessing policies, plans, and programs (Sadler 1996).

Social learning

The scientific prediction of types of impact and pattern of response is part of the social impact assessment process which integrates scientific aspects, public participation and interactions between the project proponent, the public and its different subgroups, government agencies and experts. The integration of scientific activities into a social dynamics is at the very heart of social impact assessment.

Biophysical impacts start with the implementation of the project. It is therefore possible to use the planning phase in order to adjust the project to minimize the negative and maximize the positive consequences. Social effects begin with the planning phase. Therefore they depend not only on the project characteristics but on the planning process itself. During the siting and planning process perceptions of the project are evolving, tensions between project proponents and opponents can diminish the social cohesion in the community, a hostile reaction to the project may coalesce the community opposition to a full scale NIMBY (Not In My Backyard). From an environmental stress perspective a proposed waste facility can be considered an invisible stressor and even may lead to greater psychosocial impacts than the visible stressor of an existing landfill (Elliott and Taylor 1996, pp 296-7).

A comparative longitudinal study has compared the project context, the planning process, the project characteristics and the social consequences of three waste site facilities in southern Ontario. Through the comparative study design it was possible to separate the actual impacts of the completed project from the siting and planning process. The authors conclude that the siting and planning process itself has a profound impact on the social

consequences of a project.

Actual or perceived community exclusion from site management and planning leads to a sense of disempowerment, distrust, and resentment. [...] It promotes and perpetuates adversarial relations between the community and the agencies responsible for the facility. Genuine involvement of community members in site management and planning can substantially prevent and reduce associated psychosocial distress.

(Elliott and Taylor 1996, p 312-13)

Efficient social impact assessment has to start at the very beginning of the planning phase of a project in order to attain its goal of minimizing the negative and maximizing the positive consequences. To maximize its effectiveness social impact assessment has been conceived as an iterative process with interactions and transactions between the scientific experts, including the social assessors, the public and its different subgroups, the project proponent and government agencies. In this model of social impact assessment, public involvement becomes an integral part of the process. This iterative process can be considered as a collaborative or social learning process (Rickson, Western et al. 1990; Webler, Kastenholz et al. 1995; Daniels and Walker 1996).

The term social learning refers to social aspects of individual development and learning. In this perspective social learning becomes a central element of social change (Webler, Kastenholz et al. 1995, p 444-45). A study of social impact assessment of large-scale natural resource projects in Canada, Thailand and Australia has shown the need and

opportunity of transforming, through a social learning process, social impact assessment into a community empowerment process and by the same token increase community acceptance of otherwise contested projects (Gagnon, Hirsch et al. 1993).

In a social learning perspective scientific input and local community knowledge are used to foster mutual appropriation of the project consequences among the different stakeholders (groups of the public, the project proponent, the managers of the assessment process and others). The legitimacy of the final outcome is higher when stakeholders participate in a fair and open process (Webler, Kastenholz et al. 1995). This type of process addresses the social determinants of health through a systematic and proactive process. It is an efficient way of preventing and mitigating the negative psychological effects and maximizing the positive consequences of a project.

From a public health point of view, the social learning perspective is a strategy of health promotion aiming at social development and collective empowerment (Rissel 1994). It is therefore coherent with the health determinants and health objectives approach and should be considered as an efficient public health intervention.

Sustainable Development

The concept of sustainable development, has been made known through the World Commission on Environment and Development in 1987. It has been defined as *development that meets the needs of the present without compromising the ability of future generations to meet their own needs* (World Commission on Environment and Development 1987). Through the United Nations Conference on Environment and Development, held in Rio de Janeiro in 1992, sustainable development has become the internationally accepted principle for economic development, social development and

environmental protection. The social objectives of sustainable development comprise empowerment, participation, equity, poverty alleviation, social cohesion, population stability and institutional development (Goodland and Daly 1995).

The concept of environmental assessments started to be implemented with the passage of the United States National Environmental Protection Act (NEPA) of 1969. This groundbreaking legislation and its regulations explicitly included social aspects into the concept of the environment.

The human environment is to be interpreted comprehensively to include the natural and physical environment and the relationship of people with that environment. Agencies need to assess not only so-called direct effects, but also aesthetic, historic, cultural, economic, social, or health effects, whether direct, indirect, or cumulative.

(Interorganizational Committee on Guidelines and Principles for Social Impact Assessment 1994, p 13)

This obligation to consider social consequences of projects left the choice of specific methodologies and the issues and objectives to be examined to the social assessment experts.

In the last decade, sustainable development has become the overall objective of the environmental assessment process (Sadler 1996). In order to be coherent with the social objectives of sustainable development, empowerment, participation, equity, poverty

alleviation, social cohesion, population stability and institutional development should become the overall objectives of human impact assessment. However, this shift towards specific objectives of human impact assessment has yet to become the object of professional consensus or of legal obligations.

One of the major challenges of a sustainable development perspective to social impact assessment concerns the traditionally unequal distribution between the positive consequences on a regional and national scale and the negative consequences in the local community (Lee 1984). Social equity in sustainable development is not only intergenerational, but also spatial. Local needs and aspirations have to be respected and integrated into social impact assessment of projects (Gagnon 1994b).

Sustainable development places the human being in the center of all development, it is highly coherent with the health determinants approach of public health. The health determinants of ecosystem health, economic equity and social development become the overall objective of development. The traditional efforts of public health in favour of intersectoral action for health are transformed into collective efforts of all government agencies, non-government organizations (NGO's) and the private sector towards sustainable development of social, economic and environmental capital (Goodland 1994; Health Canada 1997).

Effectiveness of the Social Determinants in the Health Approach

After about a quarter of a century of environmental assessments, human health aspects are still frequently absent even for projects with significant human health impacts (Ortolano and Shepherd 1995). Part of the resistance to integrate health aspects into the project analysis may be explained by a perception by decision-makers that the environmental

assessment process is already too long, too complicated and too costly (Dorais 1994). This perception questions the overall effectiveness of the environmental assessment process.

The effectiveness of a process refers to degree the process attains its goals or its objectives. This is the central theme of evaluation programs and evaluation research (Mohr 1995). The overall aim of the environmental assessment process concerns the prediction of future impacts in order to change a project, it's primary concern is not the evaluation of impacts once they have occurred. In order to judge the effectiveness of the environmental assessment process or of one of its components, like the health assessment, it is necessary to conduct specific studies.

The International Environmental Assessment Effectiveness Study (Sadler 1996) has been conducted in order to evaluate to which degree the environmental assessment process has resulted in better decisions, contributed to environmental objectives and how to streamline the process by improving decision-making towards the overall goal of sustainable development. They recommend different cost-effective measures to strengthen environmental assessment. A better integration of social consequences and health impacts figures among these cost-effective measures (Sadler 1996, p 275).

The World Bank has evaluated the effectiveness of their environmental assessment process in project preparation and implementation. The overall evaluation is very positive on the contribution of the environmental assessment process to decision-making, with only 15 percent of all projects that had undergone a full environmental assessment being rated in the low effectiveness category (World Bank 1997, p49).

These different studies addressing specifically the question of the effectiveness of an environmental assessment process attribute a very positive note for this prospective tool

for sustainable development. No specific studies seem to exist to demonstrate the effectiveness of a determinants of health approach in optimizing the overall population health outcome of a given project. As a better integration of social consequences and health impacts has been identified as a cost-effective measure for improving decision-making (Sadler 1996, p 275), the integration of the social determinants of health into human impact assessment should be considered as an effective public health action.

It is very difficult to study the cost effectiveness of integrating a social determinants of health approach into the environmental assessment process. A great proportion of negative impacts on ecosystems and human beings generate external costs, being paid by society. Social determinants of health have emerged as one of the most powerful modifiers of population health, generating demand for health services which are paid through taxes. The effect of unemployment on health service costs may serve as an example of quantifying external costs of social determinants of health.

A cost analysis based on the population attributable risk approach established the cost of health care attributable to unemployment at \$1,085 million in 1993.

(Canadian Public Health Association 1996)

Effective Strategies

Available knowledge on the effectiveness of social impact assessment permits to identify promising strategies for implementing the social determinants of health approach. These

strategies comprise a social impact assessment process which is issue-oriented, iterative and participative and a social learning process to enhance community involvement and social development.

Traditional planning assumed *local people will adjust to new technology or policies, and investigation of local customs, knowledge, and attitudes is irrelevant to the long-term success of projects and plans* (Rickson, Burdge et al. 1990, p 235). This paternalist approach has also been dubbed *DAD (Decide, Announce, Defend)*, where community residents are involved *post facto* in the siting process through information dissemination, public meetings, and environmental assessment hearings (Elliott and Taylor 1996, p 290). This traditional approach to project planning has met increasing local resistance, known as NIMBY (Not In My Back Yard). Social impact assessment as a social learning process has not only been shown to be the most efficient way of minimizing the negative and maximizing the positive social consequences of a project, but it has gained increased acceptance over the last decade as the only means of avoiding local resistance to some types of projects.

The issue-oriented or stakeholder approach permits the identification and focusing on key issues of the social consequences of a project. The immediate goal of social impact assessment is the best decision and management, rather than the generation of new knowledge. The encyclopedic or laundry-list type approach to social impact assessment, where investigators attempt to research almost every aspect of community life to be affected by a plan or project, has shown to produce a plethora of data, unable to support decision-making. In social impact assessment the aim is not to produce as much data as possible, but as little data as necessary (Taylor, Bryan et al. 1995, p 123). The environmental assessment process has been conceived as an action-forcing device, legally forcing decision-makers to take environmental concerns into account. The issue oriented approach in social impact assessment is a decision-forcing device, forcing the

social assessor to produce social science knowledge relevant to the decision process, favouring social development and equity.

Participation is central element in all components of any assessment process. The identification of key issues in the scoping phase and of stakeholders who are going to win or to lose is impossible without the participation of the social groups being affected. The fieldwork of social profiling is dependent on the participation of the community. Monitoring, mitigation and management is unthinkable without a very active participation of the different groups, usually through a negotiation process. Participation of the affected community is not to be seen as a unavoidable constraint and obstacle for obtaining the consent of the community, but as an transactive means of obtaining (Burdge and Robertson 1990) and communicating information on social effects. Participation becomes the central strategy for social development.

Modeling the social determinants of health approach on the issue-oriented, iterative and participative social impact assessment process, conceived as a social learning process, signifies a shift from a health protection to a health promotion framework in environmental assessments. Public health no longer aims at protecting the public from toxicological and microbiological hazards of projects, but it enhances the overall contribution of a given project towards the improvement of community and population health.

Conclusions

- Current knowledge of the social determinants of health makes it imperative to integrate these aspects into the public health process of environmental assessments.
- A public health approach to the social determinants of health must be coherent with

the traditional social assessment process.

- It is possible to make accurate prediction of tendencies and types of effects on the social determinants of health.
- Current knowledge on the direct and determinant influence of social determinants on population health does permit an estimation of tendencies and types of effects of social change on population health status.
- The state of knowledge does however not permit to build predictive models linking social change to population health status for specific projects. Public health action on the social determinants is possible without exact knowledge of causal pathways.

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